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ABSTRACT

This study tests the social facilitation hypothesis that the mere presence of others is a sufficient condition for the production of audience effects upon learning by controlling the manner in which the subject perceives the audience. Seventy-five high-anxious and 75 low-anxious subjects were divided into three groups of 25 and tested under alone, supportive audience, and nonsupportive audience conditions. Results showed that four of six groups improved significantly in balancing ability over 12 trials. There was no significant difference shown for conditions of learning nor for interaction between anxiety level and learning conditions. It was hypothesized that perhaps the Taylor Manifest Anxiety Scale is inappropriate for motor learning studies and that a learned drive approach should be considered in future studies. (A 15-item bibliography is included.) (Author)

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# THE EFFECTS OF A SUPPORTIVE AND NONSUPPORTIVE AUDIENCE UPON LEARNING A GROSS MOTOR SKILL

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# THE EFFECTS OF A SUPPORTIVE AND NONSUPPORTIVE AUDIENCE UPON LEARNING A GROSS MOTOR SKILL

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*This study attempted to test the social facilitation hypothesis that the mere presence of others is a sufficient condition for the production of audience effects upon learning by controlling the manner in which the subject perceived the audience. Seventy-five high anxious and 75 low anxious subjects were divided into three groups of 25 and tested under alone, supportive audience, and nonsupportive audience conditions. Results showed that four of six groups improved significantly in balancing ability over twelve trials. There was no significant difference shown for conditions of learning nor for interaction between anxiety level and learning conditions. It was hypothesized that perhaps the MAS is inappropriate for motor learning studies, and that a learned drive approach should be considered in future studies.*

The psychological paradigm in which attempts are made to examine the effects of the mere presence of an audience on an individual's behavior is called social facilitation. The nature of the subject matter and prevailing teaching methods dictate that most instruction and consequently learning and performing in physical education and athletics occurs in the presence of an audience of instructors, classmates, teammates, opponents, or interested spectators.

In a review of social facilitation research Zajonc [11] based his « performance is facilitated and learning is impaired by the presence of spectators », explanation on the Hull-Spence behavior theory as it relates to the general drive level. He contended that the mere presence of an audience increases the Ss arousal level which in turn increases his generalized drive state and results in the increased emission of dominant responses. During the early stages of learning the dominant responses are incorrect responses, and since audience presence enhances the emission of these dominant responses, audience presence impairs learning. Once the task is well learned the dominant responses are correct responses and audience presence facilitates performance. An experiment by Zajonc and Sales [13] confirmed Zajonc's prediction by showing that Ss emitted a greater number of dominant res-

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ponses when working in the presence of an audience as compared to a group working in an alone condition.

A number of researchers in this area have assumed that the mere presence of others is a sufficient condition for the production of audience effects upon learning and performance. This assumption does not appear valid, for while we may contend that an audience may be a source of drive, this does not in itself demonstrate that it is the mere presence of others which enhances the emission of these dominant responses. A S may perceive that the audience is evaluating his responses in some manner, resulting in a higher drive state and emission of more dominant responses. Asch [1] further suggests that we are mistaken in assuming that there is a fixed meaning to being alone or that the putting of people in the same room together has a constant meaning.

Cottrell [4] has gone one step further by postulating that audience effects occur not as a result of their mere presence but as a result of a learned source of drive. The subject has learned through a variety of previous experiences to anticipate positive or negative outcomes as a result of audience presence and responds accordingly.

Zajonc's [11] explanation of audience effects does not consider the individual differences in personality when learning and performing before an audience. Sarasan [10] and Taylor [13] have shown that anxiety, as measured by various pencil and paper tests, is related to learning in a variety of experimental situations. There is empirical evidence available demonstrating that audience presence is detrimental for high anxious Ss but not for low anxious Ss [5].

It appears possible to go beyond Zajonc's mere presence hypothesis by simply controlling the manner in which the S perceives the audience and determining what effect this may have on learning a motor skill by high and low anxious Ss.

## Purpose

It was the purpose of this study to compare the learning of a balance skill by high and low anxious Ss under the following conditions: (1) alone, (2) in the presence of a supportive audience, and (3) in the presence of a nonsupportive audience.

## Procedures

The Taylor Manifest Anxiety Scale [14] (MAS) was administered to 922 male students enrolled in a required physical education skills program. In

re-administering the MAS to 105 of the original 922 students, a test-retest reliability of .89 was obtained using the Pearson-product moment correlation coefficient with a time lapse of two days between tests.

Seventy-five Ss with scores of 27 or above on the MAS were designated high anxiety (HA) and 75 Ss with scores of 6 or below were designated low anxiety (LA). The 75 HA Ss were assigned to 3 groups of 25 by means of a table of random numbers. The 75 LA Ss were assigned to 3 groups of 25 in the same manner.

The learning task was balancing on a stabilometer. On the basis of a pilot study and consulting previous research using this or a very similar instrument, it was determined that 12-30 sec. trials with 10 seconds rest between trials was sufficient to obtain a negatively accelerated learning curve.

The measurements obtained were: (1) total time in balance per 30 second trial to the nearest 1 100th sec., and (2) total number of errors committed per trial. Errors were obtained by microswitches which were activated whenever the platform was out of balance more than 7 degrees from the horizontal. The duration of learning trials and rest periods were controlled by a 5040B Lafayette interval timer. The stimulus signaling the start and end of each learning trial and rest period was supplied by a Code Oscillator with a constant light source and a variable pitch and volume control. All clocks used in the study were calibrated in series.

The three learning conditions used in the study were:

*Alone*

Previous investigators have employed an inadequate definition of the alone condition [6, 9, 11]. Most studies reviewed had the E present and in many cases observing while the S learned the task and yet called this the alone condition. The effect of the presence of the E has obviously been overlooked in these studies. In the present study the S and E were in separate rooms and the S had no indication that he was being observed by E. The E had a Sears one-way viewer imbedded in the wall separating the S and E which enabled the E to observe the S during the trials without the Ss knowledge. This was necessary to detect any infractions or deviations from the standard directions which would eliminate a S from the study. Twenty-five HA and 25 LA Ss were tested under the alone condition.

*Supportive audience*

Twenty-five HA and 25 LA Ss were tested in the presence of 3 male peers. The instructions given to the Ss were aimed at leading them to believe that the audience consisted of members of their team who wanted them to do well and were supportive of their efforts. The audience had been trained to remain as passive as possible and not engage in any verbal exchange with the Ss.

*Nonsupportive audience*

Twenty-five HA and 25 LA Ss were tested in the presence of 3 male peers. The instructions given to the Ss were aimed at leading them to believe that the audience consisted of members of an opposing team who did not want them to do well and were not supportive of their efforts.

A short questionnaire was given at the end of the testing session to determine if the S believed the instructions he received and if he did indeed perceive the audience as the E had intended him to. The results of the questionnaire indicated that the deceptive instructions were effective.

## Results

Table I and II reveal the within-group t-ratios for time in balance and error scores of trials one to three and trials ten to twelve. This analysis indicated that four out of six groups significantly improved their balance time, while only one of six groups significantly reduced their errors over twelve trials. Figures 1 and 2 show the time in balance and error means for trials one to three and trials ten to twelve.

A treatment X levels analysis of variance was used to compare the groups using the anxiety scores as the between variable and learning conditions data as the other between variable. The analysis revealed a non-significant main effect for conditions of learning and also demonstrated non-significant interaction between anxiety x learning conditions.

A type III analysis of variance was used with data from conditions of learning and anxiety levels as the between variable and trials as the within variable. Tables III and IV indicate a significant F for the main effect of trials indicating that significant learning and reduction in errors had occurred over twelve trials.

TABLE I

*Within-group t Values for Time in Balance: Trials One to Three and Trials Ten to Twelve*

| Group | N | Trials One to Three M | Trials Ten to Twelve M | SE diff. | t | P |
|---|---|---|---|---|---|---|
| *Low Anxious* | | | | | | |
| Alone | 25 | 17.99 | 18.15 | 32.74 | .48 | |
| Supportive Audience | 25 | 17.94 | 18.56 | 24.68 | 2.49 | $<.05$ |
| Nonsupportive Audience | 25 | 17.43 | 17.86 | 30.65 | 1.39 | |
| *High Anxious* | | | | | | |
| Alone | 25 | 17.01 | 17.71 | 22.74 | 3.08 | $<.05$ |
| Supportive Audience | 25 | 17.88 | 18.47 | 18.95 | 3.11 | $<.05$ |
| Nonsupportive Audience | 25 | 17.51 | 18.32 | 27.03 | 2.99 | $<.05$ |

TABLE II

*Within-group t Values for Error Scores: Trial One to Three and Trials Ten to Twelve*

| Group | N | Trials One to Three M | Trials Ten to Twelve M | SE diff. | t | P |
|---|---|---|---|---|---|---|
| *Low Anxious* | | | | | | |
| Alone | 25 | 36.74 | 34.34 | 1.12 | 2.15 | <.05 |
| Supportive Audience | 25 | 39.88 | 38.49 | 1.42 | .98 | |
| Nonsupportive Audience | 25 | 35.26 | 35.92 | 1.34 | .49 | |
| *High Anxious* | | | | | | |
| Alone | 25 | 36.90 | 36.07 | .92 | .90 | |
| Supportive Audience | 25 | 35.94 | 34.66 | 1.03 | 1.24 | |
| Nonsupportive Audience | 25 | 35.15 | 35.71 | 1.08 | .52 | |

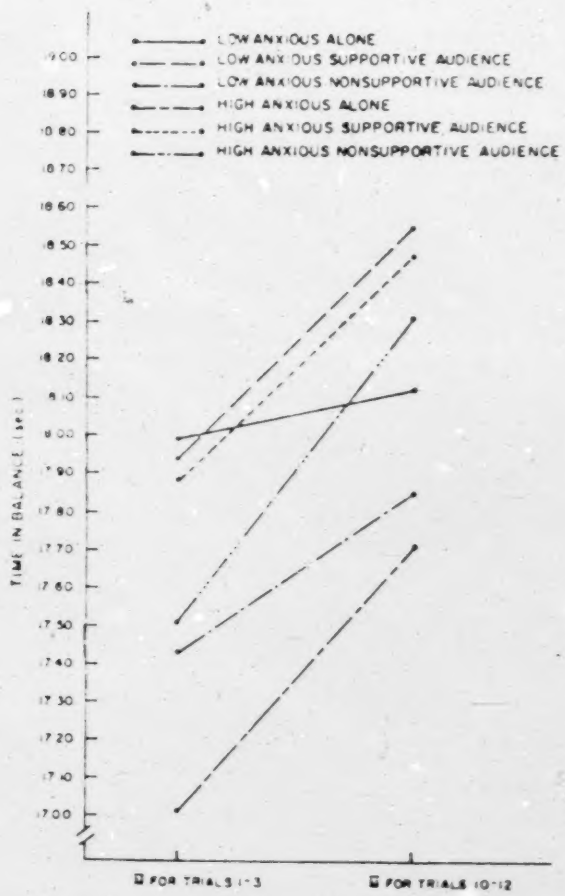


Fig. 1. - Time in Balance means for trials one to three and trials ten to twelve.

## Discussion

The results of the study do not support Zajonc's hypothesis relative to the facilitation of learning in that no differences were found between any of the learning conditions.

There are several possible explanations for the non-significant findings between learning conditions. It is possible that the motivation associated

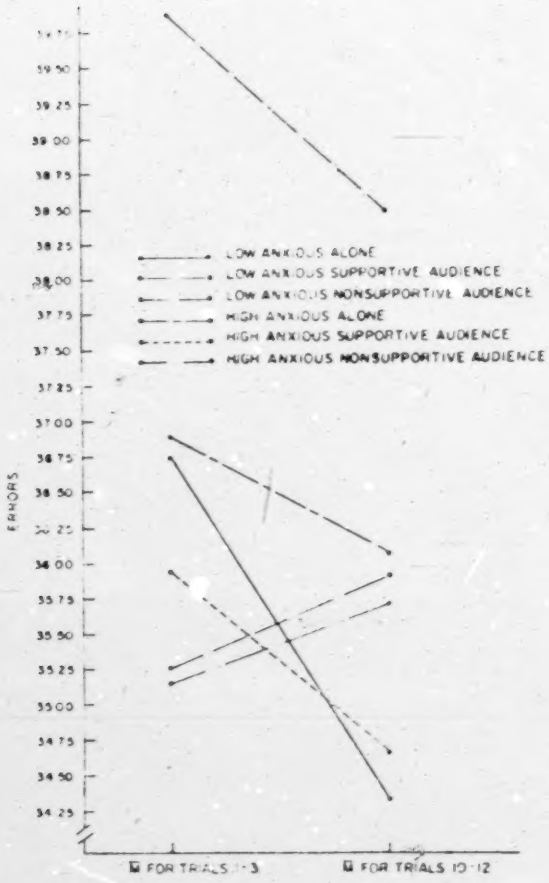


Fig. 2. - Error means for trials one to three and trials ten to twelve.

with the instructions given to the alone Ss regarding their membership on a team may have contributed to the non-significant results. Although the Ss were alone while learning on the stabilometer, they were aware that as members of a team they were expected to perform as well as possible for the team, and in addition that their scores would be compared with their teammates' scores as well as with the results of the other teams. A number of the alone Ss commented that they were concerned about how

TABLE III

*Type III Analysis of Variance of Time in Balance Scores for Groups, Conditions, and Trials.*

| Source of Variation | df | SS | MS | F | P |
|---|---|---|---|---|---|
| Subjects | 149 | 4544.05 | 30.50 | 0.0 | |
| Conditions of Learning (B) | 2 | 61.84 | 30.92 | 1.01 | |
| Anxiety (C) | 1 | 12.11 | 12.11 | 0.40 | |
| B x C | 2 | 64.49 | 32.25 | 1.05 | |
| Error (Between) | 144 | 4405.62 | 30.60 | 0.0 | |
| Within | 1650 | 2423.99 | 1.47 | 0.0 | |
| Trials (A) | 11 | 160.25 | 14.57 | 10.43 | <.05 |
| A x B | 22 | 16.85 | 0.77 | 0.55 | |
| A x C | 11 | 10.80 | 0.98 | 0.70 | |
| A x B x C | 22 | 23.69 | 1.08 | 0.77 | |
| Interaction | 1584 | 2212.41 | 1.40 | 0.0 | |
| Total | 1799 | 6968.04 | 3.87 | 0.0 | |

TABLE IV

*Type III Analysis of Variance of Error Scores for Groups, Conditions, and Trials*

| Source of Variation | df | SS | MS | F | P |
|---|---|---|---|---|---|
| Subjects | 149 | 60274.54 | 404.53 | 0.0 | |
| Conditions of Learning (B) | 2 | 587.21 | 293.61 | 0.73 | |
| Anxiety (C) | 1 | 337.13 | 337.13 | 0.84 | |
| B x C | 2 | 1275.54 | 637.77 | 1.58 | |
| Error (Between) | 144 | 58074.65 | 403.30 | 0.0 | |
| Within | 1650 | 33522.41 | 20.31 | 0.0 | |
| Trials (A) | 11 | 592.78 | 53.89 | 2.68 | <.05 |
| A x B | 22 | 580.07 | 26.37 | 1.31 | |
| A x C | 11 | 73.53 | 6.68 | 0.33 | |
| A x B x C | 22 | 432.78 | 19.67 | 0.98 | |
| Interaction | 1584 | 31843.27 | 20.10 | 0.0 | |
| Total | 1799 | 93796.96 | 52.14 | 0.0 | |

their performance compared with other members of their team. Therefore, it is possible as Asch [1] has contended that the alone Ss, although physically alone while on the stabilometer, may have felt the presence of their teammates and learned as tough they were being influenced by the physical presence of an audience. The failure to find significant differences between the supportive and non-supportive audience groups may be attributed to the fact that both groups considered the audience as being evaluative in nature. The supportive audience Ss were learning in the presence of teammates who could critically evaluate their performance and judge them as a valuable member of the team, or one that was not contributing significantly to the team efforts.

There was no significant difference in learning between the low and high anxious subjects which did not support the original hypothesis. Research concerned with the application of the Hull-Spence drive theory and the interactive effects of anxiety in motor learning and performance, has been inconsistent in the past. Carron and Morford [3], Price [9], and Singh [12] found no difference in performance between high and low anxious subjects, while Cox [5] found that high anxious subjects did not perform as well as low anxious subjects. Martens [8] however, found that high anxious subjects learned a complex task faster than did low anxious subjects. These inconsistent results may be explained in part by the fact that several different anxiety scales were used to determine anxiety level. Sarason [10] has suggested that a number of anxiety scales may be necessary to measure different anxieties. It appears possible that a more specific type of anxiety scale may be necessary to more accurately assess anxiety as it relates to motor learning. Martens [7] in a recent review of anxiety studies, has seriously questioned both the application of the Hull-Spence general drive theory and the use of the MAS in motor behavior studies.

A final explanation for the non-significant findings of the anxiety conditions may be that the results are in fact in harmony with Cottrell's [4] learned drive approach. The Ss learned not according to their level of anxiety but according to their past experience in related situations. It is possible that a S can be classified as highly anxious and learn effectively in the presence of an audience if he has had previous success under somewhat similar situations. It is also plausible that a S classified as low anxious who has previously experienced failure in a similar social situation may experience failure again.

## RÉSUMÉ

L'étude tente de vérifier l'hypothèse de facilitation sociale posant que la simple présence des autres est une condition suffisante d'effets liés à un public sur l'apprentisage, au moyen du contrôle de la façon dont le sujet perçoit le public. Soixante-quinze sujets ayant un haut degré d'anxieté et 75 autres sujets en ayant un bas furent divisés en trois groupes de 25 et testés dans des conditions de solitude, d'appui du public, et de non-appui du public. Les résultats ont montré significativement que quatre des six groupes s'améliorèrent et équilibre, au bout de douze essais. Il n'apparut pas de différence significative selon les conditions d'apprentisage, ni selon l'interaction entre le niveau d'anxieté et les conditions d'apprentisage. On suppose que le MAS est peut-être inapproprié dans des études d'apprentisage moteur et qu'une approche mettant en jeu une tendence acquise devrait être considérée dans des futures recherches.

## RESUMEN

Este estudio intenta comprobar la hipótesis de la facilitación social, considerando que la simple presencia de otros es una condición suficiente de efectos relacionados a un público sobre el aprendizaje, y a los medios de control de la manera como el sujeto percibe al público. 75 individuos con un alto grado de ansiedad y otros 75 con un grado menor fueron divididos en tres grupos de 25 y testados en condiciones de soledad, con apoyo del público y sin apoyo de público. Los resultados han demostrado significativamente que cuatro de los seis grupos mejoraron en equilibrio al final de doce ensayos. No aparecieron diferencias significativas segun las diferencias de aprendizaje, ni segun la interacción entre los niveles de ansiedad y las condiciones de aprendizaje. Se supone que el MAS es quizá inapropiado en los estudios de aprendizaje motor y que una aproximación, poniendo en juego una tendencia adquirida, debería ser considerada en futuras investigaciones.


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